UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| --- | --- | --- | --- | --- |
| 10/568,450 | 03/16/2006 | Isamu Yoshi | L9289.06111 | 1203 |

52989 7590 02/20/2009

Dickinson Wright PLLC
James E. Ledbetter, Esq.
International Square
1875 Eye Street, N.W., Suite 1200
Washington, DC 20006

| EXAMINER | |
| --- | --- |
| YU, LIHONG | |
| **ART UNIT** | **PAPER NUMBER** |
| 2611 | |

| MAIL DATE | DELIVERY MODE |
| --- | --- |
| 02/20/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/568,450 | YOSHI, ISAMU | |
| | Examiner | Art Unit | |
| | LIHONG YU | 2611 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/15/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5 and 7-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al (US 6,904,283 B2).

**Consider claim 1:**

Li discloses a multi-carrier communication apparatus (*see Li at the abstract, where Li describes an invention for partitioning sub-carriers in an OFDMA system*) comprising:

- a superimposing section superimposing corresponding transmission symbols with groups of sub-carriers constituting a plurality of sub-carriers combined together in predetermined numbers (*see Li at col. 5, lines 35-45, where Li describes that a base station periodically broadcasts pilot OFDM symbols to every subscriber; see col. 7, lines 36-49, where Li describes the pilot symbols cover the entire OFDM frequency bandwidth which is supported by a number of clusters; see col. 5, lines 18-27, where*

*Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*) ;

- a control section controlling combined transmission power of the groups of sub-carriers the transmission symbols are superimposed upon (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; a power difference ordering processing block 405 performs cluster selection based on the SINR*); and
- a transmission section transmitting multi-carriers signals obtained by controlling the combined transmission power (*see Li at col. 9, lines 65-67 and col. 10, lines 1-3, where Li describes that once the clusters have been selected, the subscriber sends a request to the base station; see Li at Fig. 1B, and col. 6, lines 7-46, where Li describes that the feedback information from the subscriber to the base station is used by the base station to select one or more clusters for the subscriber and to establish a data link between the base station and the subscriber*).

**Consider claim 2:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the superimposing section comprises an acquisition section for acquiring only the number of sub-carriers where the same transmission symbol is contained in the sub-carrier group, and superimposes the acquired same symbols with each sub-carrier of a group of sub-carriers (*see Li at col. 6, lines 18-29, where Li describes the base station receives the feedback*

*from the subscriber about the selected sub-carrier clusters to be used for symbol transmission, the base station then allocates sub-carriers according to the feedback; see col. 5, lines 40-42, where Li describes each symbol covers the entire OFDM frequency bandwidth*).

**Consider claim 3:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the acquisition section comprises:

- a repetition section duplicating just transmission bits for a number of sub-carriers contained in the groups of sub-carriers (*see Li at col. 7, lines 14-32, where Li describes one QPSK symbol can be repeated over four sub-carriers of two OFDM symbols*); and
- a modulation section modulating duplicated transmission bits using an M-ary number corresponding to the number of sub-carriers so as to acquire the same symbol as for the number of sub-carriers (*see Li at col. 7, lines 14-32, where Li describes quadrature phase shift keying (QPSK) modulation*).

**Consider claim 5:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the control section controls combined transmission power in accordance with a command transmitted from a remote communication station indicating a difference in power between combined received power for the sub-carrier group at the remote communication station and desired target received power (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, where Li*

*describes the base station allocates clusters according to a feedback from subscriber, the feedback is based on power calculation for each cluster of sub-carriers; see col. 9, lines 63-67 and col. 10, lines 1-3, where Li describes the power difference between pilot periods and data periods are used to select desired cluster of sub-carriers*).

**Consider claim 7:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the control section controls the combined transmission power in accordance with combined received power information for the sub-carrier groups notified by the remote communication station (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, col. 9, lines 55-67 and col. 10, lines 1-3, where Li describes the base station allocates clusters according to a feedback from the subscriber, the feedback is based on power calculation and ordering for each cluster of sub-carriers*).

**Consider claim 8:**

Li discloses a multi-carrier communication apparatus (*see Li at the abstract, where Li describes an invention for partitioning sub-carriers in an OFDMA system*) comprising:

- a receiving section receiving a multi-carrier signal containing a plurality of sub-carriers (*see Li at col. 2, lines 10-22, where Li describes a subscriber to the OFDMA system*);
- a measuring section measuring combined received power each group of sub-carriers formed by combining predetermined numbers of sub-carriers contained in the multi-

carrier signal (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*);

- a calculating section calculating a difference in power between the measured combined received power and desired target received power (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, where Li describes the base station allocates clusters according to a feedback from subscriber, the feedback is based on power calculation for each cluster of sub-carriers; see col. 9, lines 63-67 and col. 10, lines 1-3, where Li describes the power difference between pilot periods and data periods are used to select desired cluster of sub-carriers*); and

- a notifying section notifying a remote communication station of the calculated difference in power (*see Li at col. 6, lines 7-17, where Li describes the feedback from the subscriber to the base station*).

**Consider claim 9:**

Li discloses the multi-carrier communication apparatus according to claim 8 above. Li discloses a combining section combining symbols superimposed on each sub-carrier of the groups of sub-carriers; and a demodulating section demodulating symbols acquired by combination (*see Fig. 3 and col. 8, lines 37-47, where Li describes the subscriber receives pilot and data symbols*).

**Consider claim 10:**

Li discloses a transmission power control method (*see Li at col. 9, lines 47-54, where Li describes selecting sub-carrier cluster based on power difference*) comprising:

- a superimposing step of superimposing corresponding transmission symbols with groups of sub-carriers that are a plurality of sub-carriers combined together in predetermined numbers (*see Li at col. 5, lines 35-45, where Li describes that a base station periodically broadcasts pilot OFDM symbols to every subscriber; see col. 7, lines 36-49, where Li describes the pilot symbols cover the entire OFDM frequency bandwidth which is supported by a number of clusters; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*);
- a control step of controlling combined transmission power of the groups of sub-carriers the transmission symbols are superimposed upon (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; a power difference ordering processing block 405 performs cluster selection based on the SINR*); and
- a transmission step of transmitting multi-carriers signals obtained by controlling the combined transmission power (*see Li at col. 9, lines 65-67 and col. 10, lines 1-3, where Li describes that once the clusters have been selected, the subscriber sends a request to the base station; see Li at Fig. 1B, and col. 6, lines 7-46, where Li*

*describes that the feedback information from the subscriber to the base station is used by the base station to select one or more clusters for the subscriber and to establish a data link between the base station and the subscriber*).

**Consider claim 11:**

Li discloses a multi-carrier communication system controlling transmission power of transmission apparatus using received power occurring at receiving apparatus (*see Li at the abstract, where Li describes an invention for partitioning sub-carriers in an OFDMA system; see Li at col. 9, lines 47-54, where Li describes selecting sub-carrier cluster based on power difference calculated at a subscriber*), the receiving apparatus:

- receiving a multi-carrier signal containing a plurality of sub-carriers (*see Li at col. 2, lines 10-22, where Li describes a subscriber to the OFDMA system* );
- measuring combined received power each group of sub-carriers formed by combining predetermined numbers of sub-carriers contained in the multi-carrier signal (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*);
- calculating a difference in power between the measured combined received power and desired target received power (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29,*

*where Li describes the base station allocates clusters according to a feedback from subscriber, the feedback is based on power calculation for each cluster of sub-carriers; see col. 9, lines 63-67 and col. 10, lines 1-3, where Li describes the power difference between pilot periods and data periods are used to select desired cluster of sub-carriers*); and

- notifying the transmission apparatus of the calculated difference in power (*see Li at col. 6, lines 7-17, where Li describes the feedback from the subscriber to the base station*), and the transmission apparatus:

- superimposing mutually corresponding transmission symbols with each sub-carrier of the sub-carrier groups (*see Li at col. 5, lines 35-45, where Li describes that a base station periodically broadcasts pilot OFDM symbols to every subscriber; see col. 7, lines 36-49, where Li describes the pilot symbols cover the entire OFDM frequency bandwidth which is supported by a number of clusters; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*);

- controlling combined transmission power of the group of sub-carriers the transmission symbols are superimposed with according to a difference in power notified of by the receiving apparatus (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for*

*each cluster; a power difference ordering processing block 405 performs cluster selection based on the SINR*); and

- transmitting a multi-carrier signal obtained by controlling the combined transmission power (*see Li at col. 9, lines 65-67 and col. 10, lines 1-3, where Li describes that once the clusters have been selected, the subscriber sends a request to the base station; see Li at Fig. 1B, and col. 6, lines 7-46, where Li describes that the feedback information from the subscriber to the base station is used by the base station to select one or more clusters for the subscriber and to establish a data link between the base station and the subscriber*).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US 6,904,283 B2) in view of Todd (5,357,284).

**Consider claim 4:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses a separating section separating transmission symbols into in-phase components and

orthogonal components (*see Li at col. 7, lines 14-32, where Li describes quadrature phase shift keying (QPSK) modulation and 16QAM symbol position*). Li discloses transmission symbol are superimposed with each sub-carrier of the sub-carrier group (*see Li at Fig. 2 and col. 7, lines 37-49, where Li describes each symbol occupies the entire OFDM frequency bandwidth which is supported by sub-carrier clusters*).

However, Li does not disclose a combining section for substituting and combining one of the in-phase component and orthogonal component obtained through separation with a symbol to be paired with the transmission symbol.

Todd teaches a combining section for substituting and combining one of the in-phase component and orthogonal component obtained through separation with a symbol to be paired with the transmission symbol (*see Todd at Fig. 8, item 822 and col. 15, lines 15-36*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Li, and to have a combining section for substituting and combining one of the in-phase component and orthogonal component obtained through separation with a symbol to be paired with the transmission symbol, as taught by Todd, thus allowing for easy signal transmission, as discussed by Todd (*see Todd at col. 2, lines 25-35*).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US 6,904,283 B2) in view of Sakamoto (US 6,816,453 B1).

**Consider claim 6:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the control section performs operations in such a manner that power corresponding to the difference in power is distributed evenly across each sub-carrier of a sub-carrier group (*see Li at col. 16, lines 1-8, where Li describes diversifies the clusters of sub-carriers in situations where the power difference between pilot symbols for each cluster is large; see col. 15, lines 6-15, where Li describes a diversity cluster has less of variation in channel gain*).

Li does not disclose the operations above are increasing and decreasing transmission power of each sub-carrier.

Sakamoto teaches increasing and decreasing transmission power of each sub-carrier (*see Fig. 2, item 1200, and col. 10, lines 29-39*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Li, and to increase and decrease transmission power of each sub-carrier, as taught by Sakamoto, thus allowing for easier signal determination, as discussed by Sakamoto (*see Sakamoto at col. 2, lines 13-24*).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIHONG YU whose telephone number is (571) 270-5147. The examiner can normally be reached on 8:30 am-7:00 pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lihong Yu/
Examiner, Art Unit 2611
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611